

## REMARKS

The claims are 7-17 and 21-26, with claim 7 being in independent form. Claim 7 has been amended to more clearly define what Applicants regard as their invention. Support may be found in page 4, lines 25-27 of the subject specification as filed. Applicants respectfully request favorable reconsideration of the subject application in view of the following remarks.

In the Advisory Action, the Examiner alleged that “ongoing oxidation as measured by free radicals” was not supported by the specification. Applicants have carefully reviewed the claims and amended claim 7 herein to full comply with the Examiner’s objection.

Claims 7-12 and 14 stand rejected under 35 U.S.C. § 103(a) for allegedly being obvious over Breivik (WO 00/01249). Claims 13, 15-17 and 21-26 stand rejected under 35 U.S.C. § 103(a) for allegedly being obvious over Breivik (WO 00/01249), with evidence provided by Food Day, Global Gourmet (March 7, 1997). Applicants respectfully traverse the rejections.

The present invention relates to a novel method of farm-raising fish of marine species including fry, that are still in the growing stage. The method comprises feeding the marine species of fish a feed of 25-70% by weight of proteins, 5-60% by weight of lipids, 0-40% by weight of carbohydrates, and 0-15% by weight of one or more additional components, wherein the lipids comprise at least one oil selected from the group consisting of marine oils and vegetable oils, wherein said at-least-one oil has been treated with at least one nitrogen-containing compound, wherein 1) the amount of nitrogen-containing compound is sufficient to reduce the oil’s anisidine value, and 2) the amount of the oil being sufficient to reduce the feed’s susceptibility to being degraded through ongoing oxidation as measured by free radicals in the

feed after extrusion, thereby enhancing the feed's ability to either improve the survival rate of the marine species of fish, or improve the growth rate of the marine species of fish.

Breivik relates to a method for stabilizing vegetable and animal oils and pigments for a feed for salmonids with regard to oxidation during production of the fish fodder. When the fat source in the fish feed reacts with oxygen, oxidation products are formed. Page 2, lines 5-9. The secondary oxidation products, a complex group of compounds such as aldehydes, are measured by analyzing the anisidine value of the sample. Page 2, lines 10-13. Examples 1, 2, and 8-10 of Breivik specifically refer to analysis of anisidine values and provide detailed data on the anisidine values of the specimens. As anisidine value is the only oxidative characteristic being tested therein, it is clear that Breivik is directed toward its effects on the anisidine values. As confirmed in "Lexicon of Lipid Nutrition (IUPAC Technical Report)," *Pure Appl. Chem.*, 73(4), 685-744, 689 (2001) (Attachment D to Amendment After Final Rejection dated January 23, 2009), anisidine is a measure of aldehyde production during oxidation of fat, and is used to characterize the oxidative history of fat. It is known by those skilled in the art that aldehydes are indicators of previous oxidative damage. See Charlie Scrimgeour, *Bailey's Industrial Oil and Fat Products*, Chemistry of Fatty Acids, 6<sup>th</sup> Ed., Sec. 4.1.3., p. 19 (2005) (Attachment E to Amendment After Final Rejection dated January 23, 2009). Therefore, the disclosure in Breivik is clearly directed toward the measurement of previous oxidative damage. It fails to acknowledge the problem of ongoing oxidative damage or a means to decrease this oxidation.

In contrast to Breivik, as recited in claim 1, the subject invention discloses a method 1) to reduce the oil's anisidine value, and 2) to reduce the feed's susceptibility to being degraded through ongoing oxidation as measured by free radicals in the feed after extrusion. A measure of ongoing oxidation refers to oxidative stress of the feed, where the measurement

relates to the oxygen consumption after production. Example 1 of the subject application shows data regarding the presence and concentration of free radicals in the feed. Page 4, line 24 – page 5, line 3. As disclosed in the specification, “[f]ree radicals are associated with ongoing oxidation; i.e. a high level of free radicals in a sample is associated with a high oxidative stress of that sample.” Page 4, lines 25-27. The results of the example show that the present invention produces a feed with a lower level of free radical activity, representing reduced oxidative stress of the feed. Page 5, lines 14-15. These free radicals are not a degradation product of the peroxides or secondary oxidation products, as disclosed in Breivik, but a measure of ongoing oxidation. One skilled in the art would find the results surprising and quickly realize the importance that this invention has in the art of farming marine fish species.

In point 5, on pages 2-3 of the Office Action, the Examiner alleges that Breivik, at page 12, lines 18-23, teaches that oils treated by urea are less exposed to oxidation and degradation than untreated oils. Applicants respectfully disagree.

This paragraph in Breivik relied on by the Examiner must be looked at in conjunction with the surrounding text. By first reading the preceding paragraph, at page 12, lines 8-14, it is clear that the prolonged storage time of the feed, as disclosed in lines 18-24, is directly caused by reduced loss of pigment during the production process, rather than by urea treated oils. Lines 10-12 state that “[s]tability of the pigment with regard to oxidation is a factor that decides for how long time the feed can be stored. A pigment having an improved stability gives a feed having increased storing time.” Therefore, where, in the subsequent sentence increased storage time of the feed is disclosed, one understands that Breivik teaches that the increased storage time is due to the stability of the pigment in the feed.

Further, in support thereof, Examples 3, 4 and 6 and Figures 3, 4 and 5 of Breivik show that degradation of the pigment, astaxanthin, in heated oil is significantly reduced. Still further, Example 7 of Breivik discloses that the loss of astaxanthin during fodder production is significantly reduced if fish oil, according to that invention, is used during the extrusion process. These examples are clearly directed toward protecting astaxanthin from degradation. Page 10, lines 1-2 of Breivik. Therefore, it is apparent that the invention of Breivik is directed toward a different solution to a different problem than the presently claimed invention. In fact, the examples of Breivik teach no other effects than reduced loss of pigment.

Since Breivik is directed toward reducing the degradation of astaxanthin, it discloses process steps, which are expensive, to achieve this goal. Breivik is cost prohibitive for feed not containing carotenoids. A person of ordinary skill would not use Breivik as it is an expensive and time consuming production and does not render the benefits for white-fleshed fish, such as cod or halibut, that it does as feed for salmonids. Breivik fails to disclose or suggest a rational for using this more expensive and time consuming process for feed for white-fleshed fish.

In contrast to Breivik, the presently claimed invention discloses a method for reducing oxidative stress of feed, a new benefit achieved when using a method of producing a feed containing oils treated by urea and/or other amines or amides. That is, the presently claimed invention teaches the unexpected effect of reducing oxidative stress of feed to marine species measured as concentration of free radicals in the feed (Example 1), or measured as avoiding the negative effects of reaction between feed proteins and lipid oxidation products (Example 2). With this new benefit, one skilled in the art will recognize that increased production costs also have additional benefits, thereby making the process sensible. Upon learning the benefits and

costs of the present invention, one skilled in the art would quickly realize the importance that this invention has in the art of farming marine fish species.

Furthermore, in point 17 on page 6 of the Office Action, the Examiner questions how Breivik's storage stability is different from that of the present invention. In point 18, page 6 of the Office Action, the Examiner alleges that Breivik teaches enhanced storage stability of the feed. As explained above, Applicants do not refute the position that Breivik teaches enhanced storage for feed. However, Applicants submit that in Breivik, the benefit is due to decreased degradation of pigments, while in the present invention, the benefit is due to the reduced concentration of free radicals in the feed. Therefore the present invention is directed to different problem in the art than Breivik, and discloses a solution to this problem, which was not foreseen by Breivik.

Unlike the present invention, Breivik neither discloses a method for reducing the concentration of free radicals in the feed, nor refers to ongoing oxidation and oxidative stress. The effects of oxidation other than the effects on anisidine values are simply not taught or suggested in Breivik. Therefore, Applicants respectfully submit that the presently claimed invention is not rendered obvious by Breivik.

With regard to claims 13, 15-17 and 21-26, the Examiner alleges that one of ordinary skill in the art would have recognized that in using the feed of Breivik for white-colored fish, it would have been obvious to produce the feed without carotenoids.

Food Day fails to remedy the deficiencies of Breivik. The Examiner relies on Food Day for evidence that the omission of carotenoids from the food taught by Breivik would not require undue experimentation on the part of one of ordinary skill in the art, who would have a reasonable expectation that the food without the carotenoids would continue to serve as an

acceptable diet for all of cod, halibut and fry. While Applicants respectfully disagree with this statement, even if it were taken as accurate, the combination of Breivik and Food Day does not render the present invention obvious.

Applicants submit that the combination of Breivik and Food Day, whether considered separately or in any combination, fail to teach or suggest the claimed invention. Accordingly, Applicants submit that the claims are patentable over the cited art, and respectfully request withdrawal of the rejections under 35 U.S.C. § 103(a).

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

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